Fig. 14 Large computer display for operators.

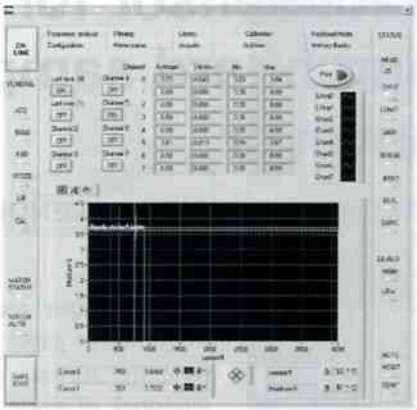

Fig. 15 Computer display for operator trends.

The IRMA-7 model D requires only air supply to keep the gauge cool and clean. No external cooling water is required, eliminating extra requirements to avoid leaks and condensation or water dropping on to the paper web.

The online gauge can measure with quite a wide distance from the paper web. The typical minimum distance is 180 mm and this bring some benefits as well. No daily cleaning of the sensor windows are needed. The web movement is eliminated by the sensor design so that the distance effect to the moisture reading is nil.

The online gauge can measure either a single sheet or the surface of a roll.

While measuring pulp web or sheets, it could be practical to continuously measure each sheet and then calculate the bale average. This eliminates errors caused by large variations in the process and surface drying. Using the special burst mode with sheets gives a unique advantage as only the sheet moistures are shown, not the meaningless gaps.

COMMUNICATION AND SOFTWARE

The model A meter has its own keyboard and display for communicating with the user. There are also two indicator LED's for moisture level crossing (high and low levels) having also hardware counterparts at the electrical connector. An RS232 port is available for communication to a PC for downloading collected data, manipulating calibration libraries and acquiring trend-like data for display. That data is automatically saved to files and is available for statistical calculations. The meter can be temporarily installed into a process at a clean spot and data is collected via the serial port at a longer distance.

The model D meter has the high-speed Profibus DP fieldbus as the primary interface but also has the RS232 serial port.. It has a voltage output for moisture (or web temperature) which is updated at full speed. Optionally, one can have two voltage outputs, one fixed for the web temperature and the other as selectable. As an option, there is a simple text terminal available for setup and maintenance in field conditions where no PCs can exist.

The regular software set for a PC with the Windows (2000/NT4/XP) operating system is IRMA7Mini, IRMA7Basic and Advanced. The advanced system is licensed and is currently included in the delivery of model D at no extra cost. IRMA7Mini is a simple program offering just a few basic features for data acquisition and archiving and runs on the smallest laptops as well. IRMA7Basic has many more features and is good for routine work, including. archiving and statistics and some analysis features.

Advanced is a complete package for data acquisition, analysis, data and library manipulation and for managing several meters at the same time. It has a large numeric display visible at a long distance. A good companion product for using several meters is the LAN232 bridging unit supporting the use of up to eight meters at once with the RS232, or with RS485 for long distances (up to 1200 metres). Data can be collected from these meters and channel differences can be displayed (Figs. 14, 15).

Moisture trends can be displayed using these software tools. Regular data files can easily be read into standard spreadsheet programs.

Real time data trends can also be easily used to record and track paper drying time behaviour over short or long periods of time.

SUMMARY

Moisture content management is one of the most important parameters in maximising profitability and saleable product quality. Excessive moisture variations of pulp, paper or converting material can be checked and monitored early in the manufacturing chain, this helps production soilving problems with minimum broke, time and cost.

The manual laboratory methods and standards (Appita, TAPPI, Scan etc.) are often time consuming and their use requires very careful sample preparation and laboratory measurement. An accurate tester can minimise the manual laboratory work required and save hundreds of hours per year.

The IRMA-7 moisture gauges can be used to measure materials such as sawdust, biofuel, wood chips, recycled paper, cellulose fibre, dry paper, final paper product, textile waste, numerous fibre products and paper and board waste. The following list summarises the main important measurement points in paper and pulp mills:

- Woodmill
- Biofuel for power generation
- Pulp manufacturing (max. 70% of moisture)
- Pulp drying
- Press felts and dryer fabrics
- Dryers
- Size presses
- Reeling
- Converting
- Box plants
- Printing houses
- Quality control laboratories
- Advanced paper drying response testers
- Automation maintenance
- Process troubleshooting
- Customer support for paper sales
- Solving customer complaints